Volunteer Lake Assessment Program Individual Lake Reports

RUSSELL RESERVOIR, HARRISVILLE, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	7,031	**Max. Depth (m):**	4.7	**Flushing Rate (yr^{1})**	93.5
Surface Area (Ac.):	26	**Mean Depth (m):**	1.6	**P Retention Coef:**	0.14
Shore Length (m):	1,900	**Volume (m^3):**	170,000	**Elevation (ft):**	1160

TROPHIC CLASSIFICATION

Year	Trophic class
1988	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

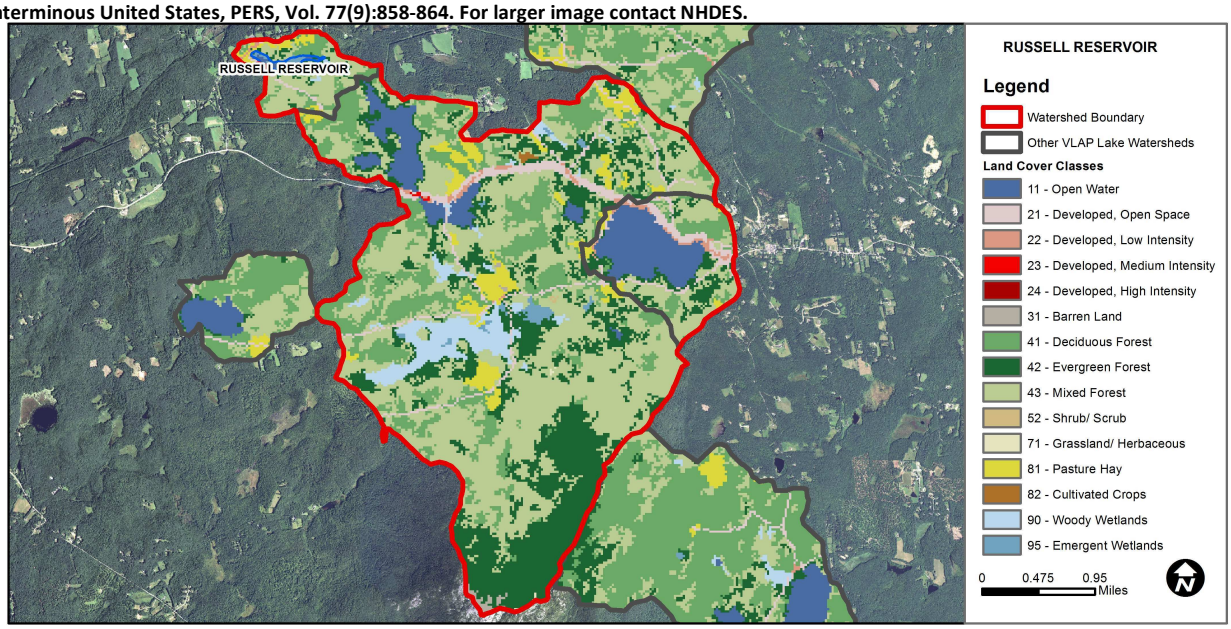
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Encouraging	There are no geometric means or there are > 2 single samples but those samples are within 75% of the geometric means criteria. More data needed.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

RUSSEL RESERVOIR - CHESHAM BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	6.9	Barren Land	0.31	Grassland/Herbaceous	0.04
Developed-Open Space	3.72	Deciduous Forest	16.16	Pasture Hay	4.48
Developed-Low Intensity	0.64	Evergreen Forest	22	Cultivated Crops	0.08
Developed-Medium Intensity	0.04	Mixed Forest	40.66	Woody Wetlands	3.77
Developed-High Intensity	0	Shrub-Scrub	0.05	Emergent Wetlands	0.78

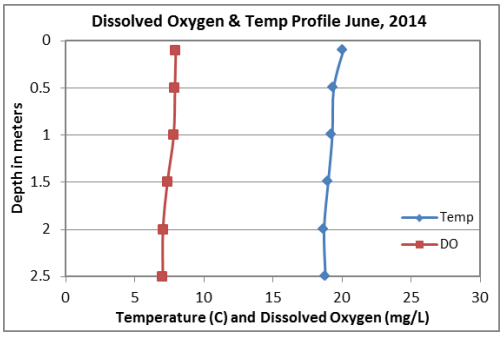
Volunteer Lake Assessment Program Individual Lake Reports

Russell Reservoir, Harrisville

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were slightly elevated and greater than the state median in June. Average chlorophyll levels increased from 2013 and were the highest measured since monitoring began. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years. However, since 2007, average chlorophyll levels have increased.
- **Conductivity/Chloride:** Epilimnetic (upper water layer), Inlet and Outlet conductivity levels were low and approximately equal to the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic conductivity levels since monitoring began. We hope to see this continue!
- **Total Phosphorus:** Epilimnetic phosphorus levels were average and equal to the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Inlet and Outlet phosphorus levels were also within average ranges for those stations, however Inlet phosphorus levels have remained at a higher level since 2011 and Outlet phosphorus levels have remained higher since 2009.
- **Transparency:** Transparency was good and improved from 2013. Historical trend analysis indicates relatively stable transparency with moderate variability between years.
- **Turbidity:** Epilimnetic turbidity was slightly elevated likely due to the elevated algal growth. Inlet and Outlet turbidities were also slightly elevated.
- **pH:** Epilimnetic, Inlet and Outlet pH levels were less than the desirable range 6.5-8.0 units. Historical trend analysis indicates highly variable epilimnetic pH since monitoring began.
- **Recommended Actions:** Increase monitoring frequency to once per month during the summer, typically June, July and August. This will allow for better understanding of seasonal water quality and historical water quality trends. Algal growth has increased in the pond and phosphorus has remained at a slightly higher level since 2011. Phosphorus is the nutrient algae use to grow. Minimizing phosphorus inputs from the surrounding watershed will help to reduce algal growth. This can be accomplished by using phosphate free fertilizers, maintaining shoreline vegetated buffers, and managing stormwater runoff from dirt/gravel roads, steep slopes, agricultural and residential properties. DES' "NH Homeowner's Guide to Stormwater Management" is a great resource. Keep up the great work!



Station Name	Table 1. 2014 Average Water Quality Data for RUSSELL RESERVOIR							
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
					NVS	VS		
Epilimnion	2.90	6.09	38.0	12	2.33	2.50	2.36	6.32
Inlet			38.7	12			1.33	6.27
Outlet			37.8	12			1.83	6.33

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Improving	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.